

YOUR EARS, YOUR HEARING, AND YOUR HEALTH

Dr. Stephen Epstein

DR. EPSTEIN: I want to thank all of you for coming. Good afternoon, I am Dr. Stephen Epstein. I am an ear, nose, and throat specialist, and I want to thank you all for taking time off from this lovely afternoon to come here for this exhibit and health fair, which I think is really a tremendous event to have, and I hope we can contribute somewhat to it.

The subject of my discussion is your ears and your hearing.

What I am going to do really is just to briefly go over some subjects that would be of interest to you, and then I am sure many of you have a million questions and I would like to just open up the discussion, and we can have an interactive kind of a session.

The title of my discussion will be "Your Ears, Your Hearing, and Your Health."

How many of you here have a hearing loss?

Okay.

How many of you here are parents of children that have a hearing loss?

So in other words, I have to gear this lecture to the people who namely have hearing loss. What we will talk about then will be hearing loss in adults and good health habits to prevent hearing loss. We will talk about some of the latest scientific research and some of the latest technology, which I think would be very appropriate to all of you.

I hope you all had a chance to visit the National Institute on Deafness and Other Communication Disorders exhibit, which is downstairs. NIDCD is one of the divisions of NIH whose research deals with hearing and related disorders, balance, smell, taste, voice, speech, and language. A significant portion of its research dollars go towards hearing and its related disorders. Some of the things that I will discuss today are results of NIH supported research.

First of all, I think it is important to understand how we hear so that we can begin to understand the pathology that is behind hearing loss. First of all, many people have a misconception that we hear with our ears and we see with our eyes, and we smell with our nose. That is not correct. We hear with our brain, we see with our brain and we smell with our brain.

The ear, like the other structures, is just a peripheral organ that sends sensations to the brain where everything that we hear is interpreted in the brain. We have to start thinking that way.

We talk about the human hearing system. We do not only talk about the ear itself, which includes three parts, but we have to talk about the whole nerve pathway that goes to the brain. This is important because there are many things that we are finding out. For example, tinnitus, which involves noises in the ear, that we hear in our ear, may actually be coming from the brain rather than the ear.

So to understand hearing we must look at the human hearing system.

Now the ear itself, or the peripheral system, has three parts. The external ear, which is the ear canal; the middle ear, which consists of the ear drum and three little bones: the malleous, incus, and stapes; and the inner ear, which is the cochlear and the auditory nerve fibers. These are the three parts that make up the peripheral hearing system. What is very important is that the middle ear simply serves as an amplifier, just like on your stereo or your hi-fi, and we will explain how that works.

It is also interesting to note that in the middle ear you have the smallest bones in the body. Here you can see the malleus, the incus and the stapes, and you can see the size in relationship to a penny, and it is amazing how these three bones play such an important part in the way we hear.

The external ear, or the ear itself, is an amazing tool, and we really have to be amazed at the Good Lord, the way He created us, because this is a very interesting system. You have to understand that when I am speaking to you, waves of sound are traveling through the environment and they are picked up by the ear drum and the three little bones, which actually amplify those waves of sound and send it from an air medium into a fluid medium of the inner ear.

It is within the fluid medium that you have vibration of these inner ear hair cells that convert the movement of the fluid to what is called neuroelectric impulses that are picked up by the nerve and sent to the brain. This is an amazing organ, as the sound goes through three different media: air, fluid, and finally, neuroelectrical impulses that go to the brain.

We are going to concentrate mostly on the inner ear hair cells because this is where the pathology exists for what we call sensorineural or nerve-type hearing loss.

If we look at a diagram of that previous picture, we can see the external ear and the middle ear. When there is disease or pathology present, it causes a conductive hearing loss. When the hair cells or the nerve are damaged, it causes a sensorineural hearing loss.

For the most part, the type of hearing loss that we are going to discuss this afternoon is going to be the sensorineural or nerve-type hearing loss.

For example, this is a diagram showing you the inner ear hair cells. From what we know, it is the destruction of, or the failure to develop, these hair cells that causes a sensorineural hearing loss. In humans, inner ear hair cells do not regenerate, so this results in a permanent hearing loss.

Now let's look at some statistics. This is a very conservative estimate, but from what we can determine, in the United States there are over 28 million people with a hearing loss of some degree. One million of them are children of school age. Five million of them are young adults. And 22 million are senior citizens above 65 years of age.

Two age groups with hearing loss are increasing because of the frequent use of technology and the exposure to loud noises. The young adult population with hearing loss is increasing significantly. And because people are living longer, this group is also increasing significantly. And these are two areas that we are going to discuss.

Now the effect of hearing loss can be very profound, but when we talk about a child that is born with a hearing loss, if it is not compensated as early as possible, it can result in delay in cognitive development, or how we think. This also results in delay in speech and language development and, of course, delay in education. So hearing is important in children and hearing loss must be diagnosed as early as possible.

A hearing loss in an adult, in its earliest stages, will cause difficulty hearing the doorbell, answering or speaking on the telephone, and watching television. As the hearing loss progresses, it interferes with your everyday communication. A hearing loss can interfere with your job performance, social activities, and, as many of you may know, it can become a source of frustration, result in being withdrawn, and affect your emotional well-being. Hearing loss can have a very significant impact on your everyday life.

Let's look at the common causes of sensorineural hearing loss. In children, most of them are either genetic or a result of developmental defects during birth and delivery. In young adults, it is related to noise exposure and may be influenced by metabolic diseases such as diabetes, elevated cholesterol, triglycerides, heavy nicotine, and caffeine effect.

In the senior citizen age group, it is a result of a condition called presbycusis, which we used to think was primarily due to aging, but we now think that there may be a genetic defect involved as well. More importantly, it may actually be caused by long-standing noise exposure. In certain people once you reach a certain age, because of the long-standing noisy world that we live in, noise exposure has had a profound effect on our hearing.

Let's talk about noise-induced hearing loss. As I mentioned, we live in a very noisy world. I do not know whether you can hear it, but there is air conditioning going, there is noise from the projector; all of this adds up over your life. Whether you are sitting in a room like this, whether you are outside in traffic noise, whether you go to the extremes of going to discos and rock concerts, or when you attend social events such as bar mitzvahs and weddings and receptions, you are exposed to loud noise. Whether your occupation is with loud machines, whether you are using power tools, throughout your life span all of this noise exposure adds up.

Now how loud is loud? Well, I am talking to you at around this level at 60 decibels. But if you go down to the extreme here, where we look at gunshot blasts and airplane jet noise, we are talking about 150 decibels.

Where is the danger zone? The danger zone begins at around 80 or 90 decibels. In other words, once you are exposed to noises at that intensity, this will begin to have an impact on your ear and your hearing. The longer you are exposed to it, the greater impact it is. So it is very important that you be aware of the loudness of the noises that you are exposed to, whether you are working in a factory with machines or whether you are working with power tools.

They did a study in Maryland where they measured the sound of the radio in the cars driven by young drivers. You can hear them a mile away because the loudness measures 120 decibels! You could imagine the poor guy or gal sitting in that car listening to that if you can hear it a mile away. This has a tremendous impact on these young people, as well as the use of stereo headphones, which are played just as loud.

So these are the factors that contribute to noise-induced hearing loss. The use of the Walkman or any device with a headset where you turn it up to maximum intensity, the boom boxes, the loud car radios, attending rock concerts and discos, and the common everyday use of power tools is enough to render your ears susceptible. The use of firearms for hunting, not to mention industrial noise exposure, the people that are exposed to work in production plants (the printing presses, construction) and the noise exposure that policemen and firemen are exposed to from sirens -- all of these add up.

There is a difference between acoustic trauma and noise-induced hearing loss. If any of you have ever been exposed to a loud explosion like an exploding tire or a firecracker, this is what is called acoustic trauma, which is a sudden burst of very loud noise that can result in a hearing loss. Noise-induced hearing loss is that which occurs over a long period of time, where you are working in a factory or working with power tools, and the ear becomes susceptible to the loud noises over continuous time.

How can you prevent this? I do not know whether you have seen any of these rock concerts on television or you have attended a live concert. You may have noticed that most of the performers have these devices in their ears. Those are not hearing aids and they are not radios of any kind where they are communicating with the stage hand. They are what are called "noise reduction earplugs." It is almost mandatory now that all performers wear these because these entertainers are the first group of people to be exposed to loud music.

So you must protect your ears when exposed to noisy or potentially noisy environments, such as when you are using power tools, and you should avoid very noisy environments when possible. And, most important of all, when using radios or headsets, you should keep the volume down.

Let's talk about hearing loss in the senior citizen age group, of which most all of you are involved.

This condition is called presbycusis, which is a hearing loss that occurs around 60-65 years of age, where 25 percent of the population have this hearing loss. As you get older, it is about 50 percent in the 75-year-old group.

Initially, we did not know the real causes of this kind of hearing loss. We now know that there may be a family history, so there may be some genetics involved. Most important of all, we are learning by research that presbycusis seems to be related to long-standing noise exposure.

It is interesting, if you test the hearing in members of some of these African tribes who live to be 100-105 years of age, they all have normal hearing. This could be a result of living in the quiet jungle. So there must be something with living in a noisy industrial world that results in hearing loss.

Presbycusis, as I mentioned, is a sensorineural or nerve-type hearing loss. In other words, it is permanent. It usually involves both ears. It usually involves the high frequency at onset and it may be associated with poor discrimination. In other words, I can hear you but I cannot make out what you are saying. Tinnitus, or noises in the ear, is present in 50 percent of the cases and usually dizziness is rare.

The management of hearing loss from presbycusis involves protecting and making the best use of your residual hearing. First of all, at the early stages, most of you will have a high-frequency hearing loss. The first thing that you are going to notice is that you are going to have difficulty hearing in noisy situations, in restaurants, in social settings where there are a lot of people. You may have difficulty in a large room that is not amplified, such as places of worship, the movies, television, and lecture halls.

It is important for you to inform your friends and relatives that they should not talk to you behind your back. They should not talk to you from another room or they should not talk to you if you are involved with watching television or working on a computer. In other words, they have to get your attention. You must have people get your attention so you can look at them.

Many people who have difficulty in understanding what people are saying can learn "speech reading," where we learn to read people's lips. A lot of you do it naturally.

There are a lot of assistive devices that amplify your doorbell, your telephone, your television. You can use these infrared systems in the movies and in the theaters. Most of the theaters in this city, including the Kennedy Center and the National Theater, have assistive devices that you can use. It sounds as if the person on the stage is actually sitting right in your lap and talking to you. There are many different assistive devices available to make your life easier.

Of course, last but not least is the use of hearing aids. This itself can cause a major problem which we will discuss.

Very often you will hear the expression where somebody may tell you, "You have nerve deafness and a hearing aid will not help you." This is contrary to what most people think because hearing aids are made primarily for people who have a sensorineural or nerve type hearing loss.

As you know, hearing aids have come a long way. They used to be in big boxes that people had to carry around. Over the years hearing aids have gotten smaller and smaller to the point where they can completely fit in the ear and not be noticeable.

It is important for you to understand that smallness is not necessarily the best for you. There is still this tremendous sense of vanity, of people being embarrassed about wearing a hearing aid, and the first impulse is, "Well, I want the smallest one possible." But the smallest one may not give you the power you need for your hearing loss. I think it is important that when you have a severe loss, a small hearing aid may not do too much for you. So you have to sacrifice a little vanity for performance.

It is interesting to note that out of these 28 million people in this country, only 10 to 15 percent of the people wear hearing aids. Why is that? Until recently hearing aids failed to resolve a problem that many of you have. In other words, you would wear them in noisy situations and they would make everything louder, so the hearing aids would end up either in your pocket or in your drawer. Well, there is new technology out now, which we will discuss, that can be of tremendous help to you. So there is no reason why a senior citizen cannot make the best use of his residual hearing, enjoy his grandchildren, whether

it be through the use of assistive devices or hearing aid.

Now when should you be suspicious of a hearing loss? In the earliest stages you have difficulty hearing in noisy situations. You have difficulty hearing on the telephone. You have difficulty hearing in theaters and places of worship. As your hearing gets worse, you begin to have difficulty in everyday conversation, difficulty at the work place, and in social settings. As a matter of fact, it is always someone else who will say to you, "You know that you are not hearing as well as you used to." It is usually someone else that brings the person to the doctor, the spouse or a friend or a coworker. You should be open and honest with yourself; if you are having difficulty hearing, you should seek help.

Let's talk about good health habits. First of all, you should get sound reduction earplugs when you are exposed to loud noises, whether it be power tools or work situations. And most important, we are educating children and teenagers about the risk of loud music and loud noises. Loud music sounds cool, but it really is not, since we are now seeing more and more young individuals with hearing loss as a result of loud music exposure. Years ago it was not until you were 55 or 60 before the hearing loss developed, and now we are seeing people in their late 20s and early 30s because of loud noise and music exposure.

From the medical point of view, you should restrict the use of coffee and cigarettes, because caffeine and nicotine are known to have an effect on the ear. The same is true with maintaining normal blood cholesterol and blood sugar. Most important of all, you should have your ears and your hearing checked on a regular basis.

I cannot stress the importance of an ear examination and I cannot stress the importance of a hearing test. I would like to mention something to you about hearing testing. You should not be tested by someone who comes to your house in a car and wants to test your hearing on the kitchen table or someone who wants to test the hearing in a noisy environment. You will not obtain an accurate measurement of your hearing under these circumstances.

Your hearing should be tested in a soundproof environment by someone who is qualified to test your hearing. It is really the only way that you are going to get an accurate measure of your hearing. There are a lot of people, who send you cards in the mail or call you, that want to come to your house to test your hearing. These are not very favorable situations. You should find out the name of reputable professionals who can test your hearing in a soundproof environment.

Let's talk about what is new in technology. First of all, hearing aids have come a long way. They do more than just amplify sound. There are several different types of

hearing aids with which you may or may not be familiar.

The first are programmable hearing aids, which allow the audiologist to modify the circuits within the hearing aid itself. In other words, years ago when you purchased a hearing aid and it was not doing what it was supposed to do they had to send it back to the factory. Now your hearing aid can be attached to a computer, and the audiologist or the hearing aid dispenser can adjust that hearing aid and modify it to your needs.

So part of the successful use of a hearing aid is related to adjusting the hearing aid to your particular hearing loss as well as to your particular environmental needs. These programmable hearing aids can be adjusted for various situations, whether it is a quiet listening situation, whether it is a noisy situation, or whether it is something in between.

The latest technology in hearing aids is the digital hearing aid. This is a whole new concept from the conventional analog hearing aid where sound is converted to numbers. Using this new concept, the background noises are subtracted while speech is amplified. This has been the big breakthrough. Many of you may have been having difficulty with your hearing aids where everything is amplified; the digital hearing aids can amplify the spoken word and diminish the unwanted background noises. Many hearing aids have a combination of both and are able to provide you with the adequate amplification and at the same time eliminate the background noise.

You may or may not have heard of cochlear implants. A cochlear implant is an electronic device that can be implanted into the inner ear for people who have profound deafness where a hearing aid or an assistive device cannot serve them any purpose. In other words, they have no residual hearing at all.

The cochlear implants have been around now for almost 30 years. There are about 20,000 people in the world that have cochlear implants, of which 5,000 of them are children under 18 years of age. These are all people with severe to profound hearing loss, who now through advanced technology are able to hear.

These cochlear implants have come a long way from when they were originally used. In the beginning, all they did was provide awareness of sound in the background. Now these cochlear implants can provide hearing to the point where people can actually hear what people are saying without having to look at them or rely on any cues. They can even hear on the telephone. One of the main purposes of cochlear implants is to enable children born with or developing a profound hearing loss to “hear” and develop speech and language.

There are two new devices now being introduced. One of them is an implantable hearing aid, and this is a hearing aid that can be implanted into the middle ear itself for

people who have a mild to moderate sensorineural hearing loss. These hearing aids are nothing but power drivers that drive the bones inside the middle ear to amplify the sound to overcome the hearing loss.

These have just been introduced, and there is considerable concern as to whether or not this is going to be an effective approach. First of all, once you implant the device in the ear, what if something goes wrong? We do not know about the long term effects that these devices will have on the middle ear structures, whether they will damage the middle ear structures, or whether you have a risk of infection. It sounds great to have something implanted in your ear that you do not have to take in and out. We are really not sure that the middle ear will be strong enough to withhold it over a long period of time. We know that the inner ear is tolerable to the cochlear implant, but will the middle ear be as durable with implantable hearing aids? Time will tell.

The newest thing on the horizon, which you may or may not have heard about, is the disposal hearing aids. Just like your disposal lenses. They are going to be coming out probably within the next month. They are being put out by a very reputable company. These hearing aids will have several possible combinations, depending upon your hearing loss, where each unit will last for about 30 days. They are self-powered, and you just throw them out and you get a new one. Each one costs about \$40, which means you spend about \$80 and get yourself a pair of hearing aids for 30 days.

The attractiveness of disposable hearing aids is, you do not have to spend \$5,000 or more for two digital hearing aids. The question is, are they going to provide the same sophistication, and over time, will you be spending the same amount of money? The question comes up, too, whether or not these hearing aids will do the same job. Nonetheless, the disposable eye lenses have worked. Of course, hearing loss is a little bit more complicated, so we will have to see what happens with the disposable hearing aids.

Let's talk a little bit about research in regards to the ear and hearing. You probably have been aware of the whole Human Genome Project. We know that 50 percent of the children that are born with a permanent hearing loss have some sort of a genetic defect. One-third of these children have what is called a syndromic hearing loss, which means the hearing loss is related to some other defect in the body such as the eye, the heart, and the kidney. The majority of the children, two-thirds of them, have what is called nonsyndromic hearing loss, in which there is just hearing loss alone.

Scientists have already identified 16 of the possible 70 genes that can cause hearing loss. We have already isolated one of the genetic defects that can be detected by a blood test. If a child is born with a hearing loss, we can request a blood test for the connexin 26 gene defect to determine whether or not the child had this particular genetic

defect.

The other big issue on the horizon related to this is gene therapy. It is still a long way away. Once we know the defect in the genes, scientists hope that in the near future they will be able to correct or modify these genes, which will then help correct the related defect. Wouldn't it be nice, for example, if someone with diabetes, elevated cholesterol, or even a hearing loss can have their problem corrected by altering a defective gene? This is the whole concept of gene therapy. This is still a long way off, and there are many moral and ethical issues involved. In other words, are we violating the laws of nature? Were we meant to be a certain way? What is going to happen when parents can go to a vending machine and choose the hair color and the eye color of their children? Gene therapy, though it has a tremendous potential, is going to be very controversial.

As I mentioned in the beginning, when inner ear hair cells are destroyed, they cannot be regenerated in humans. That is why the hearing loss is permanent. But we do know that in birds and in lower mammals, inner ear hair cells do regenerate. Scientists are studying the signals in birds and lower mammals to see if they can apply these same signals in humans. Perhaps through research we will be able to find the signal that can stimulate inner hair cell regeneration.

In the body there are these stem cells that with the right stimulation can be converted into any type of cells.

Research is being conducted where scientists are taking these stem cells and implanting them in the inner ear to see if they can regenerate hair cells. Genetics and inner ear hair cell regeneration are two of the biggest areas in the field of hearing research. It is important to protect and preserve your hearing. It is a sound investment.

I would like to talk about tinnitus. This is a problem about which many of you are concerned. Tinnitus is nothing more than noises in the ear. Tinnitus is a symptom and not a disease. It affects 40 million Americans; about 10 million Americans seek medical assistance because it is so annoying. The average age is about 59 years. It usually involves both ears and most people usually have this symptom for about 20 years.

The most common causes of tinnitus or noises in the ear is a hearing loss. We know that tinnitus is commonly associated with a hearing loss.

I just want to show you that there is a whole list of medications that have been prescribed for tinnitus. The main reason most of them do not work is because we really do not know what causes tinnitus, so most of these medications are usually given as a shot in the dark.

We are now learning about what causes tinnitus. As I mentioned, certain types of tinnitus may originate in the brain and not in the ear. Until we learn about what actually causes tinnitus, we are not going to really have any effective method of treatment. I find the most important thing to do is to reassure you that tinnitus is related to your hearing loss and not to a brain tumor! Informing and assuring the patient is the most effective form of treatment. You should also avoid certain things that may make tinnitus worse such as alcohol, caffeine and nicotine, and aspirin-related medications. Background music in those quiet situations is a good way to mask out tinnitus. So until we have some effective method, this is the best way to manage tinnitus.

What I would like to do is open the floor to any questions that you may have about anything pertaining to hearing loss.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: Okay. The question was where can you get a good audiologist to test your hearing. The best thing to do is to call the American Hearing, Speech, and Language Association. They are located right here on Rockville Pike. They can give you the names of qualified audiologists in the area or people who can test your hearing. You could also ask your doctor if he knows of anybody.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, does aspirin cause tinnitus? If you are taking 81 milligrams a day, that is equivalent to one baby aspirin or one-fifth of a regular aspirin and it should not cause tinnitus. You really have to take over six or eight regular aspirins a day before you might develop tinnitus. Most people who take either a baby aspirin or half an adult aspirin once a day generally would not develop tinnitus.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: Okay. The question was what type of ear plugs should you use. Well, it depends on what kind of exposure you have. If you are just worried about your spouse snoring at night or some minor background noises, you can use the sound reduction ear plugs that you buy over the counter. They sell them in the drug stores.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: If you are really involved with power tools or much louder noise, your best bet is to purchase sound reduction ear plugs. They have to be purchased from someone who sells hearing aids because these are custom fitted, and they come in different intensity reductions. All they do is reduce the intensity of the sound. People have a concern: "If I wear them, I am not going to hear what people are saying." This is

not true. Sound reduction ear plugs do not cut out the spoken word; they cut out the volume of the sound and about 20 decibels to 40 decibels, depending on age and equipment. You can reduce it 40 decibels and so on. So sound reduction ear plugs are probably the best way to go if you are really involved with loud noises, whether they be power tools or loud music.

The over-the-counter ear protectors are fine for minor noise exposure. There is always the situation when you go to weddings, bar mitzvahs, and affairs where the bands play very, very loud. In an emergency all you have to do is just put cotton in your ear or go into the bathroom and get some tissue paper or toilet paper and just stuff it in your ear. That will be adequate to provide some reduction of sound.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: Okay. The question was concerning loss of hearing following cardiovascular surgery.

(End Tape, Side A.)

DR. EPSTEIN: -- I had heard of several people who had developed a hearing loss as a result of cardiovascular surgery.

There is not much information to document anything, but I can only speculate in saying that hearing loss has to do with the reduction of oxygenation to the inner ear. Maybe the circulation was already restricted in that ear and now it became aggravated. If you really look at the total number of people who develop hearing loss as a result of cardiovascular surgery, there are very few. So it has to be an individual factor. But now, as you know, that more and more people are having bypass surgery without the heart/lung machine you may see less of that. We will have to see.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, can you tell whether hearing a loss is outer ear, middle ear, or inner ear? Absolutely, yes. In other words, when you get a complete hearing test, they not only can tell you the pattern and the degree of the hearing loss, but they can tell whether it is a conductive hearing loss involving the outer or the middle ear and they can tell us whether it is a sensorineural hearing loss involving the inner ear.

We can also look at a pattern and we can tell you whether it was congenital. We can tell you whether it was noise-related or we can tell you whether it was related to presbycusis, because they all have different patterns. So we can tell a lot by a complete hearing test.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, is caffeine a potential hazard for hearing loss? I am not talking about one or two cups of coffee a day. As you know, there are many people, particularly in Seattle and on the West Coast, that drink 10–15 cups of heavy black coffee a day. This is certainly a risk. If you are just drinking one cup of coffee a day, I would not really get excited about that.

When I mention these things, I talk about things in extreme. If you are a heavy coffee drinker or you eat a lot of chocolate, particularly if you already have an existing hearing loss, there is a certain amount of risk there. There has not been any research to prove that, but I think there is a lot of anecdotal evidence around that for people who have a preexisting hearing loss, keeping your nicotine and caffeine down could prevent aggravation of the hearing loss.

You are drinking three or four cups a day? Let me ask you, do you drink it black or with cream? Drinking coffee with cream or milk is better than drinking it black because, as you know, the cream and milk neutralizes the caffeine. So three or four cups with milk or cream may be okay.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was about Meniere's Syndrome. Meniere's Syndrome, to summarize in its simplest terms, is like glaucoma is to the eye. There is an increased fluid build up in the inner ear, where the individual can have varying degrees of symptoms of fluctuating hearing loss, episodes of dizziness, and noises in the ears. And I think the most incapacitating part are the dizzy spells. There is a whole range of treatment for Meniere's Disease. Ninety percent of the people can be controlled with a medical regimen. For those who don't respond to medical regimens, there are various surgical procedures that can be done depending upon whether you have residual hearing or not.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The best results with the cochlear implant have been observed in children who have been born with a profound hearing loss and get the implants at an early age. They are now putting cochlear implants in children below one year of age. They have had very good success with these children developing speech and language.

In the older deaf child, or in the adult who has been deaf for most of his life, the success of the cochlear implants has not been as great. It is believed that when you go beyond a certain point in your life, learning speech and language with the cochlear

implant becomes more difficult.

There have been a lot of deaf people who have gotten the cochlear implant not only for speech and language; particularly for people in the deaf population that chooses to sign, the cochlear implant has given these people an awareness of environmental sounds. In other words, these people know that there is a car approaching you or that there is a fire alarm that is going off. So a lot of deaf adults have chosen to get the cochlear implant for that reason.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was about people who wear hearing aids. Are there certain brands that people like better than others? Not really. There are a lot of hearing aid companies that produce a wide variety of hearing aids. The rule I like to tell people is that you should go to a hearing aid dispenser that represents many different major companies. Among all the companies, let's take five or six of the major companies, there is something for everybody in terms of power, in terms of programmable hearing aids, in terms of digital hearing aids, in terms of certain sophistications that you may need based on your hearing loss and lifestyle.

I have been severely hearing-impaired since birth, and I wear two powerful behind-the-ear hearing aids. Because these are good for me does not mean that they are good for you. So as a general rule, you should go to someone who represents many different brands to find the best one for you.

I do not like to mention brands but I do not encourage people to go to hearing aid dispensers that just have one brand and sell one type of hearing aid, since this does not give you a choice. It is like when you buy a car; you check out different manufacturers to see what this car offers versus that one, and then you make a decision based on your needs and financial status. I think the same approach should be utilized for hearing aids.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The most common cause of tinnitus or noises in the ear is a hearing loss. It usually occurs in both ears. Some people have tinnitus in one ear. It usually lasts for a long time. We do not know the exact mechanism of why the tinnitus develops, except we know that it is related to a hearing loss. Treatment has not been successful because we don't know the exact cause of tinnitus. We know what causes diabetes, so we can devise medication to correct the diabetes. We know what causes elevated blood pressure, so we have medications for hypertension. Until we know the exact mechanism of what causes tinnitus, we will not have any effective medications to treat tinnitus.

The most important treatment for tinnitus is reassurance. People with tinnitus want to be sure they do not have a brain tumor or Alzheimer's disease. After a complete evaluation, you can reassure these people. You try to eliminate the mystery of tinnitus. You tell them, "You have a hearing loss. The tinnitus is from the hearing loss", and they are assured. The most common problem in coping with tinnitus is in quiet situations. Playing background music usually conceals the tinnitus most of the time.

Counteractive noise for tinnitus has been around for a long time in the use of masking devices. Masking devices, in general, have not been very well received. In other words, you are presenting another noise to mask out the noise you have, which many people do not tolerate.

The majority of the people can live with their tinnitus. There are people that become very stressed over tinnitus. For these people there are two options. The first is to give these people a mild antidepressant, which calms them down. The latest approach is called Tinnitus Retraining Therapy (TRT). William Shatner, who played Captain Kirk in Star Trek, had very severe tinnitus and received TRT, where they teach the brain to distract itself from the tinnitus. In other words, the tinnitus no longer becomes stressful.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was what causes dried wax. Well, it is interesting that you should bring that up. There is definitely a racial factor. People of Asian background generally have dry wax. As a matter of fact, they make a lot of scaly skin rather than wax. So it is more of a racial factor than anything else, and the best thing to do is to use steroid cream in your ears to keep them lubricated. There are some people that have dry skin from eczema or skin allergies. It is best to keep the ears dry and use steroid cream. There are many people who tend to make more ear wax than others. I don't encourage self-cleaning or self-irrigation of your ears. You should see your doctor on a regular basis.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was how do loud noises cause a hearing loss? I think you could understand that if you understand anything about acoustics. You can blow out an amplifier if you play it too loud; the circuits will wear out. It is the same thing with the inner ear hair cells. We know that over time, these hair cells can only tolerate a certain volume, beyond which the volume becomes destructive to the hair cells. Once the sound enters the ear above 80–90 decibels, it begins to destroy the cells because that is the maximum tolerable level. The longer you are exposed to the sound at that level, the more destruction of hair cells there are. This is where the sound reduction plugs come in. They

reduce the loudness of the sound. Musicians are wearing them, and they can hear speech and music perfectly normally. They can hear the quality of music very well. It's just cutting the volume of music down 40 decibels to take it from 100 decibels to 60 decibels.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, "I have a condition where I get dizzy only in certain positions." Is this Meniere's disease? You may have something else. There is a condition, usually following an inner ear viral condition, which results in loose crystals in the inner ear that can result in recurring episodes of dizziness in certain positions only. This can be corrected by certain exercises. Consult your ear specialist about this condition, called Benign Paroxysmal Positional Vertigo (BPPV).

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, "I have a hearing loss that is the same in both ears; can I just wear a hearing aid in one ear?" Well, that is a very simple answer. The Good Lord gave us two ears for a reason. If you wear one hearing aid, everything is going to go into that ear. What you are hearing in that one ear is the background noise *and* what people are saying to you. But you have to understand that we have depth of hearing, just like you have depth of vision. With two hearing aids, I hear you from there; the noise is in the background. So if you have hearing loss in both ears, you should have hearing aids in both ears. If I turn one of my hearing aids off, everything is flat. Even my own voice is flat. When I turn it back on, there is dimension. I now can hear the sound in the background and your voice in the foreground. Binaural hearing is an important part of the reception of hearing, and that is why the use of two hearing aids is important when indicated.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, if very old people have not had good results with hearing aids, will the cochlear implant work?

Generally that is not the way it is approached. The implants are only good for people who are profoundly deaf, who have little or no functional hearing whatsoever, where the hearing aids will not work at all. There are a lot of factors that lead to the successful use of hearing aids. For example, there are some people who have very poor discrimination. In other words, they cannot understand the sound so no matter how loud you amplify the sound, they are still going to have difficulty understanding. That is one factor. The other factor is maybe related to the use of the older type hearing aids, which just amplified the sounds and amplified background noises as well. So now the new programmable digital hearing aids might be more effective. I would not give up on

hearing aids unless you have profound deafness or severe to profound hearing loss. Many times speech reading and assistive devices are helpful. Then there is the expense of the newer hearing aids. But I generally tell people not to give up. I think what you have to do is get yourself in the hands of a good audiologist or hearing aid dispenser who can work with you with diligence and patience. I think the majority of the people can be adequately fitted with hearing aids when indicated. You just have to be with the right person.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, are there any tests to measure how the balance system works? There are quite a few. The most common test used is called an electronystagmogram (ENG), which is like a cardiogram is to the heart. This test can tell us pretty much how the inner ear balance system works, whether it is a peripheral problem, or whether it is a central nervous system problem. An ENG can determine whether it is related to positional problems like you had, Meniere's disease, or an inner ear tumor. An ENG is used along with the examination, the audiogram, and appropriate x-rays when indicated to determine the cause of your dizziness.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was whether there are many problems in fitting senior citizens with hearing aids. Most people, like you, primarily have a high frequency hearing loss, with some reduction in discrimination. When you purchase a hearing aid in the State of Maryland, there is a law saying that you have a 30-day trial period. You can purchase a hearing aid and try it in all your everyday life situations and make all the necessary adjustments. If after 30 days you are not satisfied, you can return the hearing aid and get a refund minus a service charge.

A good hearing aid dispenser can usually predict pretty well what is going to work for you. Sometimes you have to try a few different types of hearing aids.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was would a hearing aid be appropriate if the loss is in only one ear? If you have a hearing loss in one ear, you will have difficulty hearing on the side of the hearing loss and will have difficulty hearing in noisy situations. If this is the case, then a hearing aid will help.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, is it okay to clean the wax out of your ears? I generally do not encourage people to do that themselves. There are a lot of over-the-

counter products where you can wash out your ears. I see more problems with people trying to do this yourself. If you have a tendency to have wax build up, I would suggest that you go to your doctor and have your ears cleaned out regularly, particularly if you wear hearing aids. If you have wax build up in your ears and you wear hearing aids, you are going to get a lot of feedback in your ears and should have your ears checked regularly.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was regarding candling. Candling of the ears is a procedure where they actually use candles that are supposed to evaporate the wax or destroy wax production. I do not advocate candling.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, "What can I do to hear better at the theater, movies, and places of worship?" Well, first of all, all of the theaters in Washington, DC, including the Kennedy Center, the National Theater, and the Warner Theater, have infrared systems. So all you have to do is just go there and just ask for an amplifying device. Most movie theaters also have them. As a matter of fact, all you have to do is check the movie guide and you will see a half a headset; that means this particular theater is equipped with infrared systems. I understand that more and more places of worship are also purchasing these systems.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, "Do I need to do anything special to use these infrared systems? Do I need hearing aids?" No, there is nothing to prepare. You give them your driver's license, and they give you the device. If you are sitting in the last row of the balcony with this device, it is as if the person on the stage is sitting on your lap. The sound is brought right to your ears. It is a very phenomenal system and it works very well for most people.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, is there any correlation between blood pressure, tinnitus, and vertigo? The only correlation is that some blood pressure medications may cause dizziness.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, do blood pressure medications affect the inner ear? They do not cause inner ear disease, but we see a lot of people that come in because

they are dizzy, and one of the first things I ask is, “What kind of medications are you taking?” A lot of blood pressure medicine can affect balance, but it does not directly affect the inner ear.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, why do people have increased sensitivity to sound? Hyperacusis, which is the increased sensitivity to sounds, is a fairly well known phenomenon. In many cases we really do not fully understand why people have it. If you have it, for example, in noisy situations, sound reduction ear plugs are effective.

There are people that have such severe hyperacusis that they are very sensitive to even normal everyday sounds. Many of these people have normal hearing, and sound reduction plugs may be helpful.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: Are they doing any more research on tinnitus at NIH? They are doing more research than ever. There are a lot of funds now being spent on tinnitus research. We now know that certain types of tinnitus may originate in the brain and not in the ear. This could be a major breakthrough in the treatment of tinnitus.

There may be different types of tinnitus and there may be different sources of origin. We have to fully understand how the ear really works before we can understand the pathology. We also have to create animal models to reproduce tinnitus before we can understand the causes of tinnitus.

(Inaudible--Someone not at a microphone asks a question).

DR. EPSTEIN: The question was, how do you manage ears with dry skin? People who have very dry skin, I encourage them to keep their ears dry. When you bathe, wash your hair, use shampoo, hair spray, hair coloring, and other substances -- you must protect your ears and keep them dry. Consult your doctor about the use of cortisone cream for your ears.

Thank you very much.

(Applause.)

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